



American Association of
State Highway and
Transportation Officials

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October 10, 1996

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Office of the Secretary
Federal Communications Commission
Washington, D.C. 20554

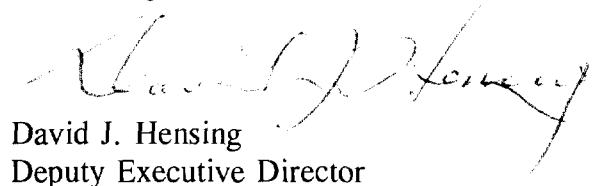
FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Dear Sir or Madam:

Enclosed are an original and nine copies of AASHTO's reply comments on WT Docket 96-86 concerning The Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Agency Communication Requirements Through the Year 2010.

Do not hesitate to so inform me should you have further comments or questions regarding this submittal.

Yours truly,


David J. Hensing
Deputy Executive Director

encl.

cc: Chester Jones
Jack Stanton
Jan Machis

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Before the

Washington, D.C. 20554

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WT Docket No. 96-86

Chester Jones, Chairman

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of)	
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The Development of Operational,)	WT Docket No. 96-86
Technical, and Spectrum)	
Requirements for Meeting)	
Federal, State and Local Public)	
Safety Agency Communication)	
Requirements Through the)	
Year 2010)	

Notice of Proposed Rule Making

To: The Commission

COMMENTS

The American Association of State Highway and Transportation Officials (AASHTO) respectfully submits these comments to the Commission's Notice of Proposed Rule Making in the above captioned proceeding.

AASHTO is the national association of the state departments of highways and transportation in the 50 states, the District of Columbia and Puerto Rico. Its scope includes all five principal transportation modes, and its major purpose is to foster the development, operation and maintenance of an integrated national transportation system.

AASHTO, through its Special Committee on Communications, has been involved in matters related to radio frequency communications and associated systems for more than 40 years. AASHTO serves as the Commission's certified frequency coordinator for the Highway Maintenance Radio Service. AASHTO is an active member of the Intelligent Transportation Society of America (ITSA) with membership on many ITSA committees, including the ITSA Telecommunications Committee.

POSITION STATEMENT

In this proceeding, the Commission seeks to address the present deficiencies in public safety wireless communications as well as its expanding spectrum needs. Included in the items under consideration are: current lack of interoperability, minimal access to emerging technologies, limited service feature options, less than optimal transmission and reception quality, as well as the lack of available spectrum.

AASHTO participated in the Public Safety Wireless Advisory Committee (PSWAC) proceedings and supports the positions identified in the *PSWAC Final Report to the Commission*.

There are, however, areas where further detail with respect to Transportation Agency spectrum usage is warranted. The following comments will provide that necessary elaboration.

Early public safety spectrum allocation was primarily confined to the 30-50MHz band. Most State highway departments installed radio systems operating on frequencies in the 47MHz range in the 1950's. The use of two way radio communications systems in the day to day, as well as emergency response activities, has increased. The resulting increase in congestion, and the lack of technological advances in equipment operating in this band, has limited the effectiveness of these systems.

Advances in technology have presented an opportunity for many small radio system users to migrate their systems to VHF and UHF frequency bands. The relatively large service areas which encompass statewide transportation agency operations results in systems consisting of a high number of radio units and multiple transmitter sites. In fact in terms of equipment and facilities, the State transportation agency is almost always the largest state radio system. The cost associated with the replacement of a complete system of this size has restricted these agencies from rapidly reconfiguring their systems. Governmental entities must operate within relatively long budgeting cycles. This fact alone necessitates a period of from five to 10 years for the complete conversion of such a system.

The proliferation of radio systems operated by small governmental agencies (counties, cities, etc.) also limits any transition for large system operators. This is due primarily to the unwillingness of such agencies to "share" frequencies and systems with other organizations.

A possible solution to this problem is for the Commission to continue the policy of setting aside a number of frequencies (channels) for statewide operations. This concept would allow the state governmental agencies to plan for future migration and improvement of their systems without limiting the operations of the other agencies, who would have access to a separate frequency pool. Spectrum reuse by the smaller agencies would be promoted, and is feasible, since the service areas do not normally overlap.

The regional planning process for the National Public Safety Planning Advisory Committee's 800MHz Public Safety radio service frequency assignments has enjoyed a level of success. There is a perception among some public safety users that all services do not have equal representation in the planning process.

AASHTO supports a planning methodology for the assignment of all newly allocated spectrum, which recognizes that highway and transportation agency usage of telecommunications systems is increasing, and that these users are often the first respondents to both man made and natural emergencies. The optimum planning process should give each user group an equal voice in spectrum allocation decisions. The current process allocates all available spectrum based on fixed percentages to each category (radio service) of users. A better approach is for some

spectrum to be shared between all categories of users with some allocated to specific groups of users. A minimum of 10 percent of newly allocated spectrum in each band should be set aside for transportation agencies.

The use of Commercial Communications Service Providers helps alleviate congestion resulting from the lack of sufficient "clear" frequencies in many areas of the country. However, while adequate for routine operations, commercial systems cannot replace private systems. The lack of system control by the end user in periods immediately following incidents and disasters makes commercial systems unreliable. This shortfall was clearly demonstrated on April 19, 1995 when the Federal Office Building in Oklahoma City Oklahoma was bombed. In responding to that incident, the officials of the Oklahoma Department of Transportation noted that the conventional telephone system was overloaded and that cellular service was not much better. The only reliable means of communications for crews directing emergency response activities was the Oklahoma Department of Transportation's private two way radio system.

Although most public safety agencies operate their own private communications systems, there is a degree of interoperability between them. This activity is limited to systems which operate within the same frequency bands. The future migration of all systems to a common frequency band would enhance interoperability. Most governmental entities lack the funding necessary to accomplish such a migration in a relatively short time frame.

The current approach for interoperability with 800MHz systems needs improvement. The equipment currently offered by manufacturers is too costly for small entities. The lack of a basic technical interoperability standards has resulted in a segment of the industry offering two competing operating schemes, resulting in non-compatible technology. The outcome is less competition between suppliers and higher costs for users when upgrading their system, since the purchaser is essentially locked into one manufacturer. It also results in adjacent political and operational jurisdictions being unable to communicate directly due to dissimilar technologies. The Commission should establish basic technical interoperability standards which, when adhered to by manufacturers, would result in greater economies of scale for end users and would promote a baseline interoperability between them.

The aforementioned limitations do not, however, prohibit interoperability between entities who enter into cooperative covenants prior to the purchase and installation of their systems. The Nevada Department of Transportation successfully developed a shared regional communications system based upon partnerships with other state agencies, local governmental entities, federal agencies and utility companies. This shared approach resulted in increased spectrum efficiency, increased interoperability, economies of scale, as well as increased system capability and capacity.

The definition of Public Safety currently adopted by PSWAC is accurate. It could be expanded to reflect the fact that other public service providers are often active participants with traditional public safety organizations in emergency response operations. Public safety radio

systems are used for routine conversation where information is not time sensitive. The other mode of operation is in response to major incidents where the mitigation of the loss of life and property requires time sensitive response. It should be recognized that all public safety agencies as well as public service organizations conduct a portion of their day to day activities in the emergency response mode.

A shared common system presents the optimum possibility for interoperability. In the absence of such shared systems the nationwide allocation of mutual aid channels offers a minimal level of interoperability and should be provided.

The Commission lists a number of state and county governmental entities which are currently planning combined interagency communications systems. All of the systems referenced operate in the 800MHz frequency band. The approaches vary from limiting users to like entities, (i.e. state governmental agencies, county agencies), exclusively to an approach that combines utility companies, state and local governmental entities, along with federal agencies, to maximize the benefits of sharing costs and facilities.

There are a number of interim steps and approaches which will provide a form of interoperability including dedicated mutual aid channels and the use of cross band repeaters. While providing some improvement over a complete lack of interagency communications, the only method of providing true interoperability between multiple divergent organizations is a shared system.

The allocation of 10 simplex and 10 repeater pair channels would seem adequate to achieve a minimal level of interoperability. If this approach is adopted the Commission must, through rule making, establish basic technical interoperability standards which will be required of all manufacturers for this equipment. This is not to say that the Commission should mandate whether to use FDMA, TDMA, or CDMA, as constant advances in technology will eventually outdate these current technologies. The failure to do so will result in the continued lack of interoperability which severely limits inter system communications. The result is not only an operational limitation, but results in sole source purchases for future system modifications.

While it would seem that all users would benefit from the ability to communicate with all other similar users, some users do not, and will not, desire or use such capacity. A requirement that all equipment be capable of operating on the mutual aid channels would not change this largely political problem. It could, however, result in increased cost for equipment.

The key to future communications system development is advances in technology. Modulation techniques now allow up to four channels within a 25KHz bandwidth. This represents a four fold gain over current equipment operating in the UHF frequency region. The demand for new features by the end user will undoubtedly result in additional technological advances resulting in new services. Intelligent Transportation Systems will be a major user of these new systems and services such as vehicle location, route guidance, emergency Mayday transmissions, along with a multitude of other services related to the safe and efficient management of the nations intermodal transportation infrastructure. Transportation agencies are

currently installing systems which provide weather condition reports from remote, unmanned sites. This information allows more efficient management of the work crew in times of inclement weather. The improved response time for these workers results in greater safety for the motoring public and enhances the safe and efficient movement of goods.

Full motion video allows traffic management center personnel to quickly determine what resources are needed at the site of hazardous material incidents and other major highway calamities. The use of these as well as other service features will increase as products which enable their adoption are marketed. Without sufficient spectrum allocation, it will be difficult if not impossible for these types of systems to proliferate.

In general, system performance and its related requirements are similar. There are, however, operational features and capabilities which are unique to various systems. With the exception of mutual aid channels for interoperability, we see little benefit in the Commission attempting to assist the system designer by mandating all features.

State departments of transportation (DOT) operate systems which encompass the entire State. In some cases the DOT shares communications facilities with county and city highway and street departments within the State. In many states, this type of arrangement is not possible due to equipment incompatibility. It is unclear how a requirement that public safety licensees share systems could be enforced.

The advantages of a shared system approach include greater interoperability as well as economies of scale. It is, however, possible that the cost to a small entity utilizing a system consisting of a single fixed base station with a few mobiles to construct and operate their system would be less than paying an access fee to a large system operator. The Commission's part in this process should be to allow mutual operations rather than mandate them.

New technologies offer improved voice quality with reduced bandwidth. Data transmissions may require additional bandwidth to accommodate required data rates. The Commission should leave the decision of which technology is utilized to the system operator. While the four modulation technologies listed -- TDMA, FDMA, CDMA and Narrowband -- offer improvements in spectrum efficiency, each method differs in various areas and no single technology is the best for all systems due to the uniqueness of these systems.

Antenna systems which offer specific coverage patterns are currently used by many radio system operators. This approach facilitates frequency reuse and results in optimum system performance.

Trunking is currently limited to systems operating in the 800MHz frequency band. It is conceivable that trunking, coupled with narrowband modulation techniques, could result in a dramatic increase in system performance for systems whose operating frequency is lower than 512MHz. This is, of course, limited by the willingness of manufacturers to produce the appropriate equipment at an affordable cost.

The rules should not mandate or limit any technology, but be crafted to permit operational flexibility. A neutral approach for regulation would be to establish channel bandwidth allowing the end user to aggregate channels where appropriate. It would seem counter productive to mandate specific technologies in light of the rapid nature of change currently being experienced. Rules should permit applicable technologies with channel bandwidths designed to allow maximum flexibility. Basic technical interoperability standards would not restrict the innovation of the manufacturers and is consistent with neutral approach towards technology.

The frequency coordinators currently provide assistance to license applicants and will continue in that role. It is unclear what responsibility could be transferred to the coordinators which would benefit the current process. In the end, the system user will make the final decision based upon many factors, including system performance and cost. The coordinator can and will, assist in the process. He cannot, however, make the final decision for the system purchaser.

The Commission's reluctance to establish minimum basic technical interoperability standards has contributed to the current incompatibility between equipment offered by different manufacturers. At the same time, requiring that all manufacturers build equipment meeting a single technical standard could limit research and development of newer technologies. The lack of receiver standards limits frequency reuse and will become a greater impediment when narrowband systems are located in close proximity to existing wideband systems. The wideband

receivers will receive transmissions from both systems. Specifying narrow receiver bandwidths will enhance the spectrum management capabilities of the frequency coordinators.

The most efficient method of spectrum allocation for the entire public safety services would be to allocate a contiguous block of spectrum for all agencies. There is a difference of opinion as to what specific band is optimum. Public comment indicates that the VHF High Band (150-174MHz) and UHF Band (420-512MHz) have good propagational characteristics for wide area or semi wide area operations. The 800MHz band requires more fixed sites to provide equivalent coverage.

The current spectrum allocation and licensing approach, while not perfect, has served the land mobile radio user and the Commission well. It is a well recognized fact that the increased usage of radio communications systems has created a need for additional spectrum in order to combat the limitations of overcrowding and congestion. The Commission has attempted to address this problem through the rule making process with PR Docket 92-235.

The result has been a protracted proceeding which began in 1991 and is, at this time, still partly unresolved. The interleaving of new narrowband channels between existing channels without creating interference, requires complex engineering analysis on a case by case basis. The Telecommunications Industries Association has produced a document which establishes a standardized methodology for the modeling and simulation of narrowband/bandwidth efficient technologies operating in a post "refarming" environment, as applicable to Frequency

Coordination. The Land Mobile Communications Council has formed a Task Force which will evaluate this study as well as other aspects of the Commission's Refarming Order.

The allocation of new spectrum would not be affected by the aforementioned problems since there would be no existing users to consider. The frequencies included in such an allocation could be assigned in accordance with a planning process prior to implementation. This would eliminate many of the problems associated with attempting to locate new systems near existing systems operating on adjacent channels. With any transition to a new system, equipment cost and limited funding require a relatively long timeframe for modification of large systems.

Prime candidate spectrum for reallocation include Federal Government allocations as well as the possible reassignment of television broadcast channels in the 174-220MHz range.

Commercial wireless services are currently used where applicable and will continue to be utilized. These services, however, have limited value for anything other than routine operations since the public switched telephone network is the first system to experience saturation during emergency operations.

There are needs for the Federal Government users to intercommunicate with public safety users. There are many areas where dedicated Federal frequencies are under utilized. Sharing Federal frequencies may provide an option to increase the possibilities for public safety.

The allocation of additional public safety spectrum will help to satisfy the current and emerging needs of public safety communications systems. The Commission can help assure this by limiting any new assignments to systems which meet the Commission's spectrum efficiency standards. Any new allocations should be adjacent to existing public safety allocations if possible.

The nine frequency bands identified by National Telecommunications and Information Administration (NTIA) for transfer to non-Federal use have little promise for use in land mobile radio systems. The propagational characteristics of these bands makes them less than desirable for land mobile communications. Some of these frequencies are absorbed by the human body and converted to heat, making them dangerous for mobile and portable communications applications. They are, however, suited for fixed point to point systems and possibly some Intelligent Transportation System applications.

The frequencies in the 335.4MHz to 399.9MHz band are optimum for two way radio systems. An allocation in this frequency band could accommodate some future public safety spectrum needs.

The issue of sharing has been discussed previously in this document. One action the Commission could take to encourage sharing is to establish loading standards for all applicants. This could force multiple public safety agencies to share systems in order to meet the minimum

loading levels per channel. Trunking along with spectrum efficient modulation techniques will facilitate sharing by making systems operate more efficiently.

The leasing of excess capacity has little merit for public safety agencies for a variety of reasons. Public Safety organizations are largely prohibited by law from furnishing what could be considered commercial services. It is unclear if there would be any excess capacity if systems are designed in accordance with loading requirements. A fully loaded system would not have excess capacity. The current frequency coordination process has resulted in a level of exclusivity which permits sharing, but does not require it.

The proposal of the NTIA to promote increased usage of shared Federal/non-Federal systems has merit. As with many of the other issues considered in this proceeding, there may not be a single plan which adequately addresses all possibilities. Perhaps a joint office consisting of representatives of both NTIA and FCC could develop rules for the implementation of such shared systems.

The descriptions of public safety organizations and the unique characteristics of their communications systems are accurate. In areas where the shortage of spectrum is severely limiting the service capabilities of these agencies it may be easier for them to obtain funding needed to make a transition to new technologies. Changes mandated by FCC rules could assist public safety organizations in gaining approval for expenditures by providing additional

justification. The Commission correctly concludes that longer planning and procurement cycles are required of public safety agencies compared to other two way radio system users.

Commercial services can supplement the private networks of public safety agencies but cannot provide the level of security, control or dependability needed for these organizations.

The idea of funding the future transition of all public safety radio systems to new spectrum bands through revenue produced by auctioning the vacated bands to commercial users could provide the necessary funding for those agencies. The issue of spectrum auctions is, however, controversial. The proposal, then, should be viewed as two separate proceedings. The vacating of the current allocations upon transition to a new frequency band is reasonable. The vacated bands could be allocated to existing private radio system users in the non public safety radio services which also experience many of the problems which plague public safety users.

The Commission has pursued a system of electronically filing radio system applications for some time now. The frequency coordinators support this concept, which, when fully operational, will reduce the burden currently placed on the Commission's staff and improve the timeliness of the process. Applicants are currently permitted to begin operation upon the date the application is mailed to the FCC by the coordinator.

The proposal to require frequency coordination post-license grant has no merit. There is no accompanying documentation in this proceeding which indicates that such a methodology would result in anything other than mass confusion and post licensing conflicts.

The Commission also proposes that frequency coordinators maintain a publicly accessible frequency data base. It fails, however, to suggest the funding method for maintaining such a data base. Access to such a data base by the public who generally has minimal knowledge of radio technology and FCC rules, has no potential for any improvement in the licensing process.

Technology-Neutral is a term that alludes to a policy which will foster greater choice for end users while increasing competition in the market place. An examination of the current record for systems operating in the 800MHz frequency range reveals that the opposite effect may exist. The lack of basic interoperability technical standards limit interoperability.

APCO Project 25 began in 1989 and is incomplete at this writing. There is a difference of opinion as to whether FDMA modulation technique is superior to TDMA. User group standards offer one method of adopting standards which can result in benefit to like radio system users. The rapid pace of technological advances limits the benefits of such a process. Technology often outpaces the planning process.

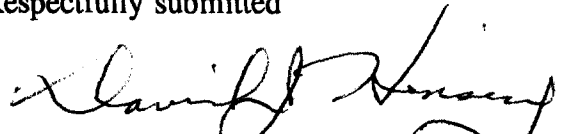
CONCLUSION

AASHTO supports the concept of a spectrum allocation which is vital to all public safety organizations. This allocation must be accompanied by a regulatory structure which establishes guidelines in order that the spectrum usage is maximized by the user.

The existing Public Safety Frequency Coordinators and their member organizations are best positioned to provide the needed expertise to allow the Commission to successfully implement this next generation of wireless communications system usage.

We respectfully request that the Commission consider and act favorably on these comments as it proceeds with this important undertaking.

Respectfully submitted

A handwritten signature in black ink, appearing to read "David J. Hensing", is written over the typed name and title.

David J. Hensing, Deputy Executive Director
American Association of State Highway and
Transportation Officials